

## 2013 Maryland FMP Report (July 2014)

### Section 3. Atlantic croaker (*Micropogonias undulatus*) and Spot (*Leiostomus xanthurus*)

#### Chesapeake Bay FMP

Atlantic croaker and spot are among the most popular species pursued by near-shore anglers fishing near the bottom within the mid to lower portions of the Chesapeake Bay. They also support valuable commercial fisheries in Chesapeake Bay with Atlantic croaker ranked seventh among finfish species in value in 2013 and spot ranked 10th in value. The Chesapeake Bay Atlantic Croaker and Spot Fishery Management Plan (FMP) was adopted in 1991. The FMP's goal is to: "Protect the Atlantic croaker and spot resource in the Chesapeake Bay, its tributaries, and coastal waters, while providing the greatest long term ecological, economic, and social benefits from their usage over time." To accomplish this goal, management strategies were developed to prohibit the harvest of small fish (age 1 and younger) of both species and to recommend monitoring and research programs for stock assessments and habitat needs.

The Atlantic States Marine Fisheries Commission (ASMFC) adopted coastal FMPs for each species in 1987. The main purpose of the plans was to decrease the number of small fish caught as bycatch in the coastal shrimp trawl fishery. Bycatch reduction devices were required in the offshore coastal areas and have reduced the number of small fish caught in the trawl fishery. There have been no interstate requirements for Atlantic croaker or spot.

**Atlantic croaker** - Biological reference points (BRPs) were established for croaker in the mid-Atlantic region in 2005. The BRPs were revised in 2011 (Addendum 1) following the 2010 ASMFC stock assessment and now apply to the entire Atlantic coastal stock.<sup>1</sup> The BRPs set targets for fishing mortality and spawning stock biomass, and are ratio-based. For the threshold, if  $F/F_{MSY}=1$ , overfishing is occurring. If  $SSB/(SSB_{MSY}(1-M))=1$ , the coastal stock is overfished. The 2011 ASMFC Atlantic Stock Assessment Technical Committee evaluated the stock assessment triggers in 2011 and found no evidence to alter management.<sup>1</sup> The ASMFC Atlantic croaker plan review team accepted the 2011 stock evaluation in August, 2012.<sup>2</sup> The 2013 ASMFC Action Plan called for the development of an addendum to consider alternate croaker trigger mechanisms. Existing management triggers were not considered an effective method to respond to changes in the fisheries. The Atlantic Croaker technical committee supported a new approach – a traffic light analysis, to evaluate the fishery.<sup>4</sup> The traffic light approach (TLA) was approved as an addendum to Amendment 1 of the Atlantic Croaker FMP (August 2014).<sup>4</sup> The TLA incorporates multiple data sources into a single metric to provide management guidance. The TLA is useful for data-poor species management and replaces past management triggers. The result of the TLA will be the development of

specific state harvest reductions when harvest and abundance thresholds are exceeded.

Maryland is required to complete an annual ASMFC Atlantic croaker compliance report. This report describes the fishery, management program for Atlantic croaker, including fishery dependent and independent monitoring, regulations, commercial harvest reports and recreational catch estimates.<sup>3</sup> Juvenile indices (seine and trawl) for the Maryland portion of the Chesapeake Bay have been calculated for every year since 1959. Maryland started a new gill net survey at the Choptank River to sample adult Atlantic croaker and spot in 2013.

**Atlantic croaker Stock Status** –Based on the 2010 benchmark assessment,, overfishing is not occurring but whether or not the stock is overfished could not be determined due to data limitations.<sup>4</sup> The next benchmark stock assessment is scheduled for 2016. The 2010 stock assessment indicates that biomass has been increasing and the age-structure of the population has expanded since the late 1980's. Atlantic croaker is considered a single stock along the entire Atlantic Coast. Monitoring data from Maryland's portion of the Chesapeake Bay indicate a broad and stable size and age structure although Atlantic croaker over age 6 have become less abundant since the mid-2000s.

#### The Fisheries

Figure 1. Maryland commercial landings of Atlantic croaker from 1929-2013 (2013 landings preliminary; NMFS and Maryland DNR <sup>3</sup>). The horizontal line is the mean for the time series.

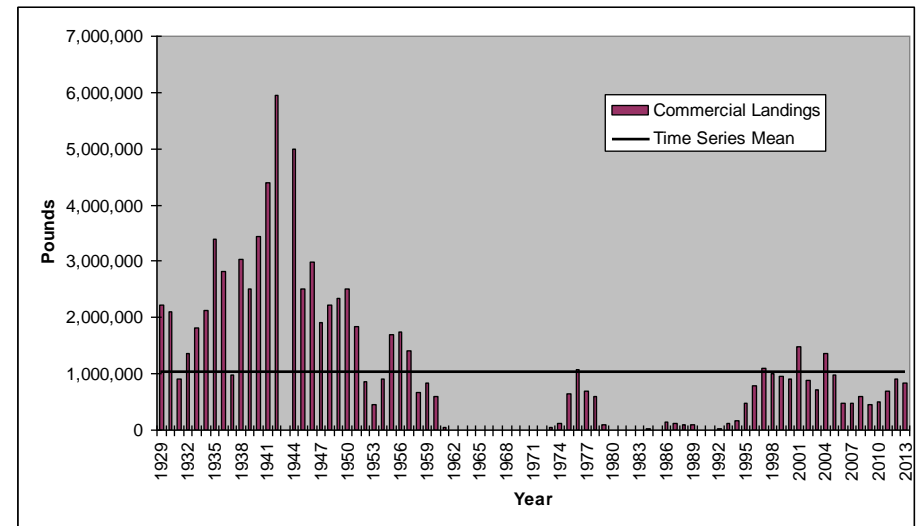


Figure 2. Maryland estimated recreational harvest and release for Atlantic croaker: 1981-2013.<sup>3</sup>

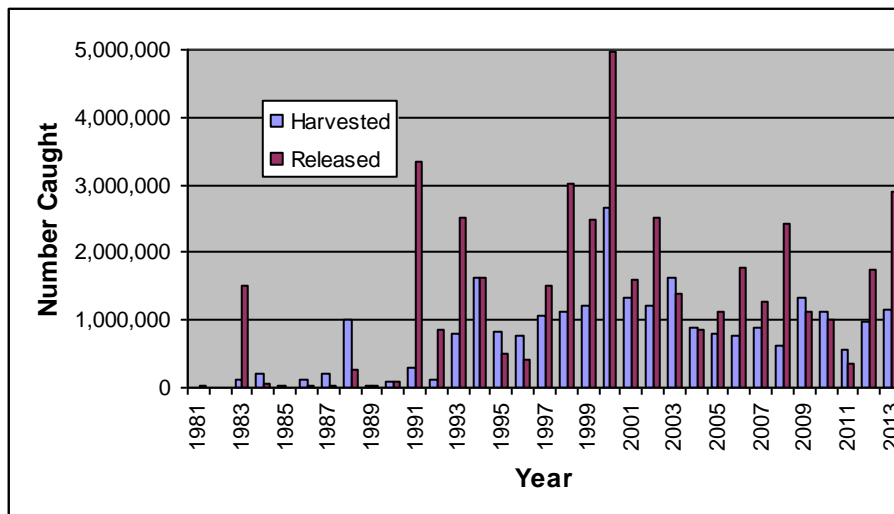


Figure 3. Virginia commercial landings of Atlantic croaker: 1950-2012.<sup>8</sup>

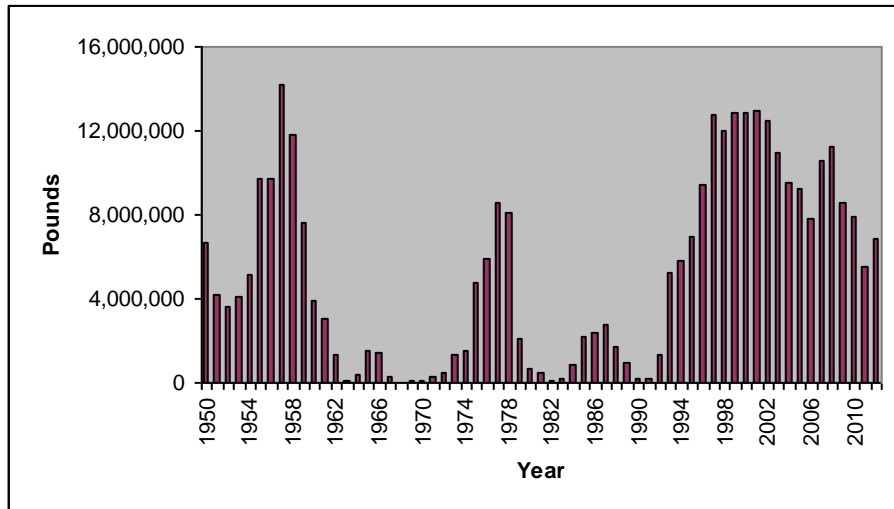
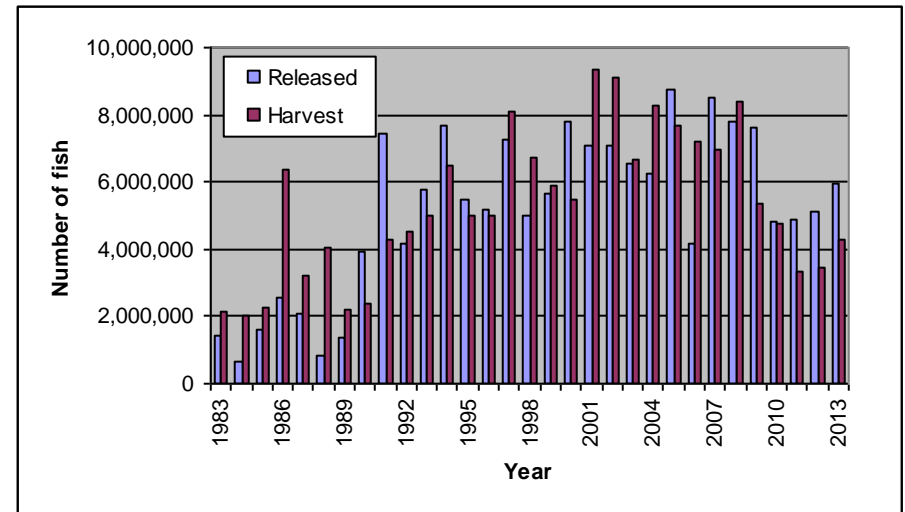


Figure 4. Virginia estimated recreational Atlantic croaker harvest and release, 1983-2013.<sup>9</sup>



**Spot** - The ASMFC Spot Plan Review Team (PRT) prepare and recommend actions (if needed) in an annual status report <sup>6</sup>. The ASMFC South Atlantic State-Federal Fisheries Management Board approved the omnibus amendment for Spanish mackerel, spot and spotted seatrout. <sup>7</sup> A management trigger for spot was included in the omnibus amendment to monitor the status of the stock until a full coastwide stock assessment can be completed in 2016. The ASMFC Management Board would consider management action if two of five relative abundance indices, at least one of which must be from a fishery-independent data source, are equal to or less than the respective data set's 10<sup>th</sup> percentile. The relative abundance indices from the coastwide recreational and commercial landings, SEAMAP-South Atlantic trawl catch-per-unit-effort (CPUE), NMFS bottom trawl CPUE and Chesapeake Bay seine survey CPUE would be considered. The Spot Plan Review Team met in 2013 and did not recommend any management actions based on the 10th percentile. The 2013 ASMFC Action Plan called for the evaluation of spot management triggers. As described above for Atlantic croaker, a TLA was approved for spot at the 2014 summer meeting of the ASMFC through an addendum to the Omnibus Amendment for Spot<sup>4</sup>. This new framework replaces the management trigger approach using the 10th percentile and is particularly useful for short-lived species such as spot. The TLA will be used to evaluate spot fisheries and if deemed necessary state-specific management actions will be developed and could include creel and gear limits, size restrictions, seasons and area closures.<sup>4</sup>

**Spot Stock Status**— Overfishing and overfished status remain unknown. Catch per unit effort (CPUE) data have been used to evaluate the status of spot. CPUE values are highly variable and differ by gear type. There is some concern that there is a declining trend. Four juvenile indices (JI) are calculated to evaluate the status of spot in Maryland. For the Maryland portion of the Chesapeake Bay, a JI is calculated for spot from the MD DNR Blue Crab Trawl Survey (BCS) and another from the Maryland Estuarine Juvenile Finfish Survey (EJFS). In addition to the Chesapeake Bay JIs, two Coastal Bays JIs are derived from trawl and seine data. These indices are highly variable. Chesapeake Bay juvenile indices indicated a very strong 2010 year class but all four 2011 JIs were low. The 2011 spot index derived from the EJFS JI was the lowest since 1967. Indices for 2012 and 2013 have increased.

Figure 5. Maryland and Virginia commercial landings of spot: 1981-2012.<sup>8</sup>

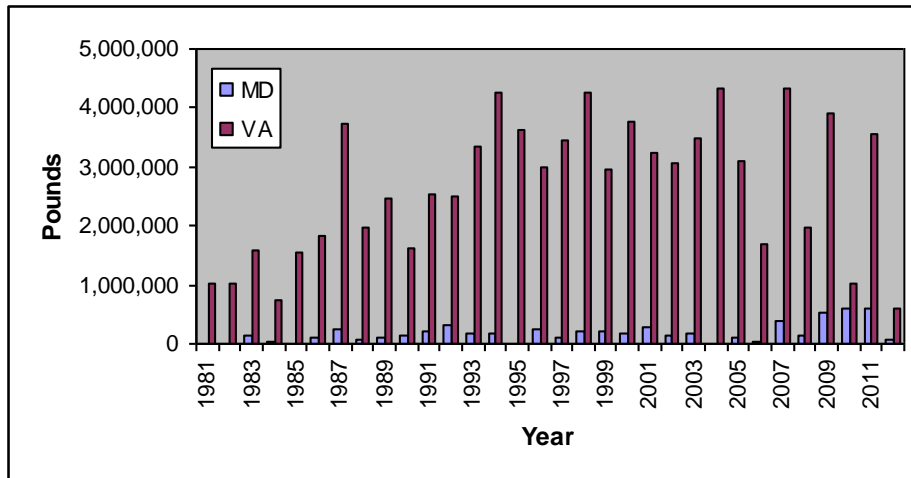
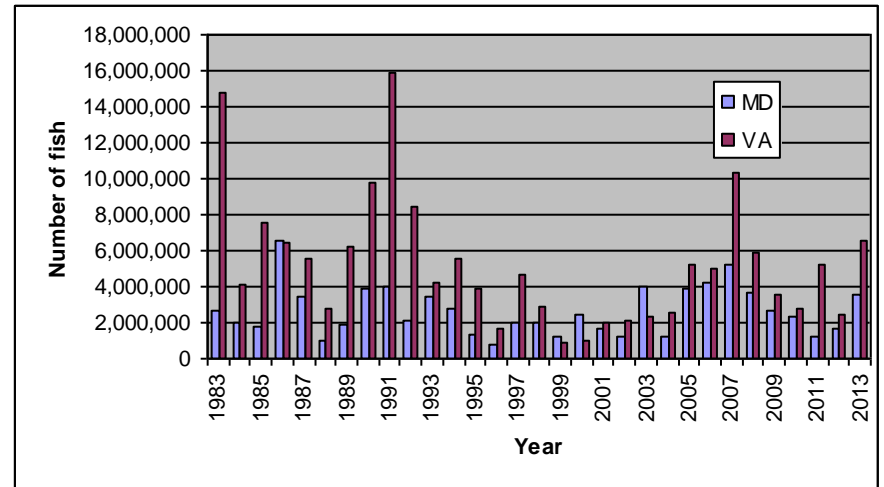


Figure 6. Maryland and Virginia total estimated recreational spot catch: 1983-2013.<sup>8</sup>



### Management Measures

There are no management measures required by ASMFC to restrict the commercial or recreational fisheries for either croaker or spot. The omnibus amendment does not require development of additional management criteria and does not define BRPs for overfishing or overfished status.<sup>6</sup> The coastal states are required to compile commercial and recreational harvest statistics and monitoring data. Annual spot compliance reports have been required since 2012.<sup>7</sup> Maryland has a recreational minimum size limit of 9 inches for croaker and a creel limit of 25 fish per person per day. There is a commercial season from March through December and a 9 inch minimum size limit. There are no harvest restrictions for spot.

### Issues/Concerns

Continued monitoring of the commercial and recreational harvest of both croaker and spot is important in order to obtain data for conducting stock assessments and evaluating the status of the stocks. There is some concern about the decreasing trend in commercial landings of spot along the coast. The ASMFC Spot PRT will continue to monitor the trend and make management recommendations if necessary. The use of circle hooks to reduce recreational discard mortality is encouraged. Both species are caught indirectly and together during other fishing activities; bycatch mortality is a continued concern. Small spot, for example, could account for as much as 80% of the shrimp trawl catch by weight and 60% by number, depending on area.<sup>10</sup> States are encouraged to use bycatch reduction devices to reduce bycatch.

Spot, also known as Lafayettes in the northern part of their range, have been increasingly used as live bait in the recreational striped bass fishery of the Chesapeake Bay. The consequences of using small spot as bait are unknown. Spot used for this live bait fishery are harvested in fish pots. Fish pot mesh sizes are being evaluated by MD DNR Fisheries Service.

A winter kill in Chesapeake Bay estimated at two million juvenile spot occurred in late December 2010 and was associated with a sudden cold snap. The consequences of this winter kill are unknown but illustrate the vulnerability of this species to sudden cold snaps.

Spot and croaker are important prey items for predators such as spotted seatrout, red drum, striped bass, marine mammals and many bird species. Their importance as prey and their dependence on coastal estuaries for juvenile habitat make them a consideration in ecosystem management.

Atlantic croaker may benefit from increasing temperatures due to climate change through enhanced survival to adulthood. A coupled climate change-population model has forecast both an expanding northward distribution of croaker and a 60-100% increase in average spawning biomass at current levels of fishing<sup>11</sup>.

## References:

<sup>1</sup> Annual Review of Assessment Triggers. 2011. Atlantic States Marine Fisheries Commission Atlantic Croaker Technical Committee.

<sup>2</sup> 2012 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Atlantic Croaker (*Micropogonias undulatus*) 2011 Fishing Year. Accepted August 2012.

<sup>3</sup> Rickabaugh, H., Jr. 2014. Maryland Atlantic Croaker (*Micropogonias undulatus*) Compliance Report to the Atlantic States Marine Fisheries Commission – 2013. Maryland Department of Natural Resources Fisheries Service June 23, 2014.

<sup>4</sup> ASMFC. 2014. Atlantic States Marine Fisheries Commission 2014 Summer Meeting Summary.  
<http://asmfc.org/files/Meetings/SummerMeeting2014/2014SummerMeetingSummary.pdf>

<sup>5</sup> ASMFC. 2010. Atlantic Croaker 2010 Benchmark Stock Assessment. Washington DC.

<sup>6</sup> Rickabaugh, H. and K. Capossela. 2011. Evaluation of the Status of Spot in Maryland – 2010. Maryland DNR Fisheries Service doc. 6-23-2011.

<sup>7</sup> ASMFC. 2011. Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout. Fishery Management Report of the Atlantic States Marine Fisheries Commission. Arlington VA 161p.

<sup>8</sup> Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division September 15, 2014.

<sup>9</sup> Personal communication from the National Marine Fisheries Service, Recreational Fisheries Statistics Division September 15, 2014.

<sup>10</sup> Peuser, R (editor). 1996. Estimates of finfish bycatch in the south Atlantic shrimp fishery. Final Report of the SEAMAP-South Atlantic Committee: Shrimp Bycatch Work Group. Washington DC: Atlantic States Marine Fisheries Commission.

<sup>11</sup> Hare, J.A., M.A. Alexander, M.J. Fogarty, E.H. Williams, and J.D. Scott. 2010. Forecasting the dynamics of a coastal fishery species using a coupled climate-population model. *Ecol. Appl.* 20(2):452-464.

<b>1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation</b> (updated 08/14)			
<b>Problem Area</b>	<b>Action</b>	<b>Date</b>	<b>Comments</b>
<b>Stock Status</b> Annual abundance of Atlantic croaker and spot is highly variable from year-to-year. Little information is available on the causes of stock fluctuations.	Action 1.1 CBP jurisdictions will continue to participate in scientific and technical meetings for managing Atlantic croaker and spot along the Atlantic coast and in estuarine waters.	2005  2009  Continue	CBP jurisdictions will continue to monitor Atlantic croaker and spot stocks and cooperate with the ASMFC to manage stocks through inter-jurisdictional management measures. BRPs were adopted for the coastal croaker stock in 2005 and updated in 2010. Current estimates of F and SSB indicate that the croaker stock is healthy and overfishing is not occurring (ASMFC 2010). The status of the coastal spot stock is undeterminable. No stock assessment has been completed and available data indicate contradictory trends. The ASMFC Spot PRT has been monitoring stock status through reports to the South Atlantic Management Board, including development of management triggers. Data from the MD Estuarine Juvenile Finfish Survey is one of five state and regional indices considered for triggering management. The omnibus amendment's adaptive management section allows states to implement management changes more quickly. Annual Spot compliance reports to ASMFC are required..
	Action 1.2.1 A) MD and the PRFC have a minimum size limit for Atlantic croaker. B) VA does not have a minimum size limit for Atlantic croaker.	Continue  1993	CBP jurisdictions will promote the increase in yield per recruit for the Atlantic Croaker and spot fisheries. MD has a 9" minimum size limit for the croaker recreational and commercial fisheries. MD & PRFC also have a 25 fish/person/day creel limit. MD has an open commercial season from March 16 through December. VA does not have any restrictions.
	Action 1.2.2 CBP jurisdictions will evaluate the need to implement a minimum size limit for spot.	1992 2009  Continue	No recommendations have been made for spot. There is some concern over declining juvenile abundance. Georgia is the only coastal state with a minimum size limit (8"). The ASMFC omnibus amendment, approved in 2011, did not require additional management criteria but recommended the implementation of conservation measures when any two measures of relative abundance indices (with at least one a fishery independent index) were equal to or below the data set's 10 <sup>th</sup> percentile. With the adoption of addendums to the ASMFC amendments (August 2014), both croaker and spot are managed using the traffic light approach (see text for explanation).

1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation (updated 08/14)			
Problem Area	Action	Date	Comments
<b>Harvest of Small Croaker and Spot</b> Incidental bycatch and discard mortality of small croaker and spot in non-directed fisheries is substantial and has the potential to significantly impact croaker and spot stocks.	Action 2.1 A) Through the ASMFC, the jurisdictions will promote the development and use of trawl efficiency devices (TEDs) in the southern shrimp fishery and promote the use bycatch reduction devices (BRDs) in the finfish trawl fishery. B) Virginia will continue its prohibition on trawling in state waters. Virginia will maintain its 2 <sup>7</sup> / <sub>8</sub> inch minimum mesh size for gill nets C) Maryland will continue its 4-6 inch gill net restriction during June 15 through September 30 and implement a 3 inch minimum mesh size along the coast. D) PRFC will continue its prohibition on gill net fishing in the summer.	Continue  Continue  1992  Continue	Commercial trawling is prohibited within the Chesapeake Bay in both MD and VA. The 2004 Croaker Stock Assessment indicated that the coastal states were successful at reducing mortality on age 1 fish. The commercial & recreational catch-at-age data showed an increasing age distribution with a few croaker at age 12. The stock assessment analyses indicated that the shrimp bycatch estimates are important to consider in the calculations but there needs a more comprehensive evaluation. ASMFC encourages states to use bycatch reduction devices (BRDs). MD currently allows attended gill nets with a stretched mesh size of 3 1/8 to 3 1/2 inches from January 1 through March 15 and 2 1/2 to 3 1/2 inches between March 16 and December 31 in the Chesapeake Bay and tributaries, with location restrictions during striped bass spawning seasons. The minimum stretched gill net mesh size in MD waters is 2 1/2 inches. Virginia has a minimum gill net stretched mesh of 2 7/8". <b>Maryland is evaluating its gear regulations, including fish pot mesh sizes for baitfish harvest.</b>
	Action 2.1.2 CBP jurisdictions will investigate the magnitude of the bycatch problem and consider implementing bycatch restrictions for the non-directed fisheries in the Bay	1992  On-going	CBP jurisdictions have evaluated the effectiveness of bycatch reduction panels in pound nets and PRFC requires reduction panels for all pound nets. Some coastal states are using panels to reduce bycatch of small fish.
<b>Research and Monitoring Needs</b> There is a lack of stock assessment data for both Atlantic croaker and spot stocks in the Chesapeake Bay.	Action 3.1 VMRC stock assessment program will continue to analyze size and sex data from Atlantic croaker and spot collected from the VA commercial fishery.	Continue	The amount of data available for croaker has increased since the 2003/2004 coastal stock assessment. The 2010 ASMFC coastal stock assessment update (benchmark) concluded that the coastal Atlantic croaker population is a single stock. Addendum 1 to the ASMFC FMP changed the management unit to a single stock and modified the BRPs. Stock assessment data for Atlantic croaker and spot is collected by the MD Estuarine Juvenile Finfish Survey, and VIMS Juvenile Abundance Surveys (formerly known as the VIMS Trawl Survey and the VIMS Juvenile Seine Survey), NEAMAP and ChesMMAP.

1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation (updated 08/14)			
Problem Area	Action	Date	Comments
	<p>Action 3.2</p> <p>A) MD and PRFC will encourage research to collect data on croaker and spot biology, especially estimates of population abundance, recruitment, and reproductive biology.</p> <p>B) VA will continue to fund its stock assessment research conducted by the conducted by VIMS and ODU, specifically designed to provide the estimates of population abundance, recruitment, and reproductive biology.</p>	<p>Continue</p> <p>Continue</p>	<p>An Atlantic Croaker Ageing Workshop was held in October 2008 and resulted in a standardized ageing procedure. High priority research &amp; monitoring recommendations include: determining migratory patterns; collecting life history information; evaluating bycatch and discard practices; and examining reproductive strategies. Spot up to age 3 are regularly represented in the commercial fishery. Commercial catch-at-age data has contracted the last several years. Length-at-age and weight-at-age have decreased for ages 1-3. Spot age 4 to 6 years are not seen every year and when present, account for a small percentage of harvest. Recommendations for spot in the 2011 omnibus amendment include: monitoring data and gear studies on discards from the shrimp, recreational and commercial fisheries; expanding sampling; assessing BRDs; continuing development of fishery-dependent and fishery-independent size and sex specific relative abundance estimates; evaluating juvenile indices to predict year class strength; improving catch and effort statistics; and developing stock assessment analyses such as a yield-per-recruit analysis and determining the onshore vs offshore components of the fishery.</p> <p><b>Commercial pound net sampling in Maryland's portion of the Chesapeake Bay was conducted bi-weekly from May through September, 2013. Atlantic croaker mean total lengths increased very slightly in 2013 from 274mm to 276mm (n=249). Croaker collected from pound nets ranged in age from 1 to 8 years. Twenty-eight percent were age 5, 25% were age 3, 22% were age 4, 14% were age 1 and 5% were age 7. Croaker, age 6 and older appear to be less abundant than during the mid-2000's. Croaker from gill net samples (n=571) were larger and averaged 296mm (likely a result of gear selectivity). The Coastal Bays trawl survey in 2013 showed a geometric mean catch of 1.01 fish per hectare: below the 25 year time series mean value of 1.62. Maryland seine surveys showed decreased Chesapeake Bay and Coastal Bays geometric means for juvenile croaker in 2013.<sup>3</sup> However, seine surveys are not good indicators of croaker abundance because croakers do not prefer inshore habitats.</b></p>

1991 Chesapeake Bay Program Atlantic Croaker and Spot Fishery Management Plan Implementation (updated 08/14)			
Problem Area	Action	Date	Comments
<b>Habitat and Water Quality Issues</b> Habitat alteration and water quality impact the distribution of finfish species in the Chesapeake Bay	Action 4.1 CBP jurisdictions will continue to set specific objectives for water quality goals and review management programs established under the 1987 Chesapeake Bay Agreement. The Agreement and documents developed pursuant to the Agreement call for: A) Developing habitat requirements and water quality goals for various finfish species. B) Developing and adopting basinwide nutrient reduction strategies. C) Developing and Adopting basinwide plans for the reduction and control of toxic substances. D) Developing and adopting basinwide management measures for conventional pollutants entering the Bay from point source and non-point sources. E) Quantifying the impacts and identifying the sources of atmospheric inputs on the Bay system. F) Developing management strategies to protect and restore wetlands and submerged aquatic vegetation (SAV). G) Managing population growth to minimize adverse impacts to the Bay environment	Continue 2000 on-going	Water quality and living resource commitments were updated and renewed in the Chesapeake Bay 2000 Agreement. These activities include the discharge of toxic pollutants or excessive nutrients into the Chesapeake Bay and its tributaries, interruption or changes in water discharge patterns, deposition of solid waste, sewage sludge or industrial waste into the Bay (which may lead to anoxic conditions), rapid coastal development, unregulated agricultural practices, net coastal wetland loss or the dredging of contaminated sub-aqueous soils. Based on the most recent available data, scientists project that 58% of the pollution reduction efforts needed to achieve the Bay restoration goals have been implemented since 1985. Excess nitrogen, phosphorus and sediment are the major pollutants. The greatest challenge to achieving restoration is population growth and development which destroys forests, wetlands and other natural areas. Habitat and water quality objectives and actions were delineated in the President's Executive Order and provide more current strategies for managing resources in the Chesapeake Bay. Estuaries are designated as Habitat Areas of Particular Concern (HAPC) for spot. A new Chesapeake Bay Program Watershed Agreement was adopted in 2014: <a href="http://www.chesapeakebay.net/documents/FINAL_Ches_Bay_Watershed_Agreement.withsignatures-HIres.pdf">http://www.chesapeakebay.net/documents/FINAL_Ches_Bay_Watershed_Agreement.withsignatures-HIres.pdf</a> . The new agreement defines new goals and outcomes for water quality and habitat.

#### Acronyms:

ASMFC = Atlantic States Marine Fisheries Commission;

BRPs = Biological Reference Points

CHESFIMS = Chesapeake Bay Fishery Independent Multispecies Fisheries Survey

ChesMMAP = Chesapeake Bay Multispecies Monitoring and Assessment Program;

CBP = Chesapeake Bay Program

FMP = Fishery Management Plan

ODU = Old Dominion University

PRFC = Potomac River Fisheries Commission

PRT = Plan Review Team

VIMS = Virginia Institute of Marine Science